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THE DUTCH IRON FACTORY AT NARSAPUR

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The strategic location of Narsapur and the selection of the Dutch: The shipbuilding activities of Narsapur[1]attracted the European sailors, traders and Companies and thus, they wanted to set up commercial establishments there, near or in and around it. Narsapur[2] was situated at a distance of 107 kms from the famous port of Masulipatam, 10 kms from Palakollu, 70 kms from Yanam [French settlement], 270 kms from Nagalwancha and thus srategically situated. It was located 1526'N and 81" 42'E on the Vasishta mouth of the Godavari river, 6 miles / 19 kms from the sea. It had the advantage of a river, which was very large, wide and convenient for ships to enter and sail out. "*The account of methweld (probably by Pieter Gilliz van Revesteyn) stated that the Godavari river was large, wide and convenient; ships of as much as 200 last burden can be sheathed or built it*," such descriptions have been vivid in the European accounts[3]. Anon, William Methwold[4], W.H. Moreland, Antonio Schorer[5] and others have recorded these facts in their narratives. All the rawmaterials and inputs required for shipbuilding were available in and around Narsapur. The teak grew along the banks of Godavari was sent by floating to the shipbuilding yards, wherever required. Moreover, the teak grew there was of high quality withstanding time, as noted by Bowrey and Hamilton. The Dutch East India Company (VOC) had been succeesful in setting up an Iron factory in Narsapur. In fact, strategically, they started nail manufacturing factories at Ponnepilly, Nagalwancha (Nagulavancha), Ramellepatnam (Ramayapatnam), Narsapore, and Palicot (Pulicat) since 1660s[6].

The Naraspur Dutch factory as recorded by Streyansham Master: Sir Streyansham Master (1640-1724) was an agent of the British EIC and his diary entries give interesting details about the Narsapur factory: The Dutch Chief visited Pollicull near Madopollam and Narsapur to view the factory there[7] and was "*much impressed by their extensive iron works, there being 'as many forges as 300 smiths may work in them*'". The entry of his diary dated April 6, 1679 recoded[8]: "*The townes of Madapollam and Narsapore [Narsapur] joyne together, the Dutch house for their Iron worke in Narsapore being a little above Muskett shott from the English Factory in Madapollam. Narsapore lyes below Madapollam downe the river, and that place is under the Governour of Metchlepatam and has the command* *of all the river for the Customes as far as Corango [Coringa]. But Madapollam, Mellick Mahmudpet, and Naurasporam [Navarazpuram[9]], though they all joyne near together to Narsapore, yet they have every one distinct Havaldars for the gathering the ground rent, independent from Narsapore or Metchlepatam at present*". Similar entery found with Wednesday 16th April, 1689: "*We went to view the Dutch house and compound at Narsapore which is a very large peece of ground, divided into two large inclosed Quadrangles, in one of which is as many forges as 300 smiths may worke in them. The compound reaches down to the River side, upon the sandy banks of which lyes many vessells, which are imployed in that great rice trade of Gingerlee.*"[10] Here, the expressions, extensive iron works, forges, smiths should be noted, because, generally, nail manufacture involves drawing, cutting, head-revetting processes, and no forging is involved. Had forging been used, then, the nails manufactured must have been for special purposes, which is discussed later.

How the ferrous industry worked under the Dutch: The Dutch acquired Palakollu (variously mentioned as Palkole, Palakollu, Pollicull etc., in the Europan documents).........5 miles / 8 kns north of Narsapur town.........was the first settlement of the Dutch on the Coromamdel Coast by paying 2000 old pagodas per annum to the Indian King (Golkonda). They opened their first factory in 1652, making it as their headquarters. They also set up factories for the manufacture of indigo, iron and weaving industries of course planted large orange and shaddock gardens for them. The fact is that the places surrounding Narsapur had been famous for iron smelting, moulding, casting, wire-drawing and other processes and manufacture of ferrous items. Any sort of iron work was there indigenously performed by the natives as speak bolts, anchorites, etc., as the Europeans noted. Incidentally, Narasapur and its adjoining places viz. Madhavaipalem (famously called Madapollam in contemporary English records) were important ports in the Godavari delta and known for cotton and timber. That is how, the shipbuilding was there and "*Once a ship of the capacity of 1000 tons was built here for the king of Golkonda*" and thus, "*The Europeans used these facilities and built their ships here as the timber, iron and steel were readily available in the Godavari regions*". The Dutch managed the factories with large number of indigenous skilled artisans and apprenticed labourers. The Dutch factors informed the company's Directors in Holland that under the supervision of one specialized Dutch nail-maker, there were 22 Indian foreman and 57 skilled workers. The specialized Dutch nail-maker, his Indian formen and workers operated after prescribed Dutch technique. Notably, they employed 300 workers in the Narsapur factory alone and 40,000 lbs, i.e, 18-20 MTs nails were manufactured per annum[11]. At Narsapur initially the nail manufacture was carried on by 10-12 workers in a day. They came from sub-urban or village areas to the town by morning and use to leave by evening after work. But, in 1664, the work force increased to 100 and 300 also, thus, evidently increase in production. In 1685, diverse sorts of nails about 20,000 lbs were manufactured at Nagalwancha factory. Similarly at Palakallu the smiths were reported to be busy in making all sorts of iron. The Dutch also had their iron workshops at Nagalwancha and Ramayapatam, as mentioned already.

How nail was manufactured?: Traditionally, the nails were manufactured out of wrought iron (implies worked rather than cast in its final shape by pouring liquid into mouds), which was in the form of blooms produced after extraction and refinement. They were drawn into bars or rods by reducing the diameters slowly by flattening and rolling. The drawing out process was accomplished by forging the bars using a water powered helve hammer and hand labour, with swedges used to size and shape the stock[12]. Then, the reduced rod was cut into required length and each piece was hammered in mould to produce nails. Nails were also manufactured by other methods like - hand forged, iron cut (flattened iron sheet was cut and then forged nail manufactured), iron wire (wire drwan process). For quality, steel was used, as could be noted for different usages. As per the archaeological evidences, the manufacture of nails in India goes back to megalithic period (c.1000 BCE) and Indus valley (c.2500-1950 BCE) hence the proceeses adopted and adapted must have been continued through Kammiyar, Kannar, Kollar, Achari ....the traditional blacksmiths[13].

Iron anchor technolgy adoted and adopted: Iron anchors were also manufactured at Narsapore and Madapallum, but, Europens recorded that they were not upto their standrards. As Narsapur was connected with shipbuilding, nail and anchor manufacturing evidently became important for it. In 1672, a Swedish expert was sent to train indigenous blacksmiths in the nanufactute of nails and cannon balls. Jan Aarnoudsz came to Nagalwancha to impart training to local smiths to improve quality. However, mention of "Aterchere" i.e, Atri Asari, Atri Achari proves that he was one of a traditional caste smiths, as noted by Thomas Clark and others in 1638[14], implying that they were experts in the smithy and they might have rather asked to manufacture according to their specifications. The nails manufactured were of 5,6,7,8 inches long. According to the working, 640 lbs of iron was required to manufacture 480 lbs nails, costing 6.2 pagodas. The cost of 480 lbs of iron was 20, 23 and 25 guilders, while the cost of steel was 35, 37 and 40 guilders. The blacksmiths at Ponnepilly got 4 pagodas aswages for manufacture of 480 lbs nails of first quality. For 5 to 8 inch nails from 640 lbs of iron, 5.2 pagodas were paid. Those who could produce 1280 lbs of iron for producing 5-pounders, they got 6.75 pagodas as wages. However, the fact being that the Indian labour was cheap during the material period, as compared to that of European. The ferrous prooducts spikes, bolts, nalils and anchors, that were manufactured at Narsapur were used for shipbuilding.

Iron and Steel idustry associated with other industries of Golconda and European enterprises: Incidentally, the Iron and steel industry in and around Nrsapur were catering to the Golconda Kingdom, as its connection with Middle-East was well established for import and export of goods. Incidentally, Golconda ruler exported goods through the ship manufactured sailing for Mokha / Mecca every year, as recorded by the Europeans. Bowrey noted[15], *"800 tons Ship built at Natsapur was sent to Persia or Mokha in 1639,"* i.e, one year could be the time for the complete building of a ship and allowed it to sail on the oceaning waters. Of course, the diamond miners also used iron blades, in the diamond exploration. Tavernier describes the use of iron in muskets and found Golconda iron better and purer than the French iron. Iron implements were used in the manufacture of coir industry for combing and twisting. Fryer observed the use of coir in ships and noted, *"Their planke (boats) and very broad and thinne, sowed together with cayre (coir) being flath bottomed and every way much deformed."* Coir produced near Narsapur was exported to Bantam from the port of Masulipatam. Narsapur manufactured long cloth painted, thus, Weavers and painters were also demand at Narsapur. Certain coated, coverred and imprenated cloths were used as sails of the ships.

The Dutch versus the British: In 1669 the English factors in Bengal preferred to build their small vessels at Narsapur instead of Hugli owing to "easier rates for materials and workmen." The European merchants admired the skilled work done at Narsapur[16]. *"She (the ship) is better trimined and a far better ship than she first came out of England."* Accordingly, the Portuguese and Dutch, as well as the English used to build and repair their ships at Narsapur. There was considerable repair work carried out at Narsapur including protection against leakage, deck-fittng and trimming. Spikes, bolts and anchors were skillfully made by the Indian smiths. Bowrey gives us a detailed account of the technique of drawing ships on the shore for repair. Whether the selection of Bengal or Narsapur had been their choice had been due to technical necessity, cheap labour or otherwise, the European had conflicts among themselves in Europe, that were reflected in their attitude towards each other in India in commercial encounters also.

Anchor and shipbuilding technologies: Shipbuilding is not restricted to the mere "......timber, iron and other materials.....", but the technology of converting them into hull, keel, rib, stem, rudder, mast, nail and then their assemblage into a ship of required tonnage. Thus, such shipbuilding techniques could not have come from vaccum or readily available for disposal to get their ships repaired at Narsapur. Therefore, the records of the European companies have to be studied carefully. In the European writings, the facts were couched with subtle remarks and Indian researchers have to pick up the information carefully. John Henry Grose[17] noted in the context of Indian shipbuilding skills on the western coast in 18th century remarked that *'their anchors are mostly European, our iron being much better, and better worked.'* Thus, it is evident that casting methods wee different from that of European as otherwise, they would have used indigenous technology and workers for casting their anchors. They would not have manufactured acnhors in India and exported out, had the quality been inferior. As the fact is otherwise, it is evident that such remarks made by Grose were motivated to disparage and suppress the superior quality of the anchors manufactured in India.

The interest of East Indian Companies in Indian Iron and Steel Industries: as mentioned already, in the 17th century, the VOC set up iron works in and around Narsapur, as the British were having their factories at Madopallam, Sadras etc. The European foundries were, in fact, employed Indian black smiths exploiting the so-called native ferrous technology. Thomas Bowrey, observed that the works employed, "*.......several black smiths, makeinge all sots of iron woke, (necessarie for Ships) whereby they doe Supply most of theire fleets with Such Necessaries and the 'necessaries' included 'speeks', bolts and anchors. Apart from iron parts, the cluster also produced rope and twine for riggingd, and had master shipbuilders, 'who have most of their dependencies Upon the English, and indeed leant their art and trade from them, diligently Obervinge the ingenuitie of Some that build Ships and Sloops here for the English East India Company and theire Agents...* " Bowrey complained of their "false heartedness", at having learnt from the English and yet working for the Dutch, in other words, such Indian workers were in great demand. Moreover, unless, the "Indian / Black-smiths" were versatile in knowing the "English method" of working Iron, they could not have produced Iron and Steel articles, goods and products so suitable to their expected standards.

The traditional technology connection among the Coastal ports and cities of India and SEA: Mentioning one coastal port-town, Gingalee, Bowrey noted[18] that, "*Here is the best and well growne timber in sufficient plenty; the best Iron upon the Coast is for the most part Vended hee and att reasonable rates, with the Workmanship alsoe; any Sort of Ironwoke is here indegenously performed by the Natives, as Speeeks, bolts, Anchors, &.*" As "Gingalee" was famous for Jagannath Pagoda, it must have been one of the Kalinga ports[19]. Acttually, the Kalinga / Orissa coast was known as "Gingalee coast" by the Europeans. As Balasore was mentioned along with Masulipatnam, Nagapatnam etc., along with Batavia, it is evident that the ports and Coastal cities were already having maritime connection and of course, the fact is too well-known to be repated here. The way he described the shipbuilding with 14 major parts with other wood, iron and woven coir products clearly prove the technology behind them. That, "*The cables, Strapps, &c. are made of Cayre, vizt. The Rhine of coco nuts very fine Spun, the best Sort of which is brought from the Maldiva Isels,*" as recorded by him[20], again proves that the traditional art of shipbuilding was followed connecting the places of Sri Lanka, Maldieves and Malabar coast. Incidentally, the Imperial Cholas were also following the same strategy for their maritimes activities.

Improved or imppoverished Iron technology?: incidentally, the Indian anchor technology goes back to very ancient period as could be noted from the anchors recovered from the marine archaeological explorations carried on by the NIO and their reports[21]. Therefore, the Europeans must have been surprised about the Indian ferrous metallurgical expertise in casting anchors for ships, though, they were 'not so good as those made at Europe' as Hamilton observed[22]. Had they were, 'not so good as those made at Europe', why they wanted them to be manufactured here? Ironically, these foundries of Iron and Steel were located Balasore, where the English and the Dutch had trading stations before moving up north. One authority on Iron considers that the presence of many large scale Iron smelting workshops in Kathiwad and near Masulipatnam, were legacy of European enterprise connected with shipbuilding[23].

Antiquity of iron and nail in particular in India: Generally, scholars andr researchers have been of the opinion that ship built in India were joined together with wooden joints and nails were not used. However, as so far no Indian ship submerged has been recovered to confirm any such result, its usage of it also cannot be denied, as the archaeological evidence of nail manufacture in India goes back to Indus Valley [.2250-1950 BCE] and megalitic period [c.1000 BCE]. Rakesh Tiwari found evidence for iron-working included slag and iron artifacts such as a nail, arrowhead, knife and a chisel in Vidhya region[24]. Radiocarbon dates for the iron bearing deposits range between 1400 and 800 cal BCE. Nail, clamp, spear-head, arrow-head, awl, knife, bangle, sickle and plough share were also found at Malhar (Chandauli Dist) and Laturdewa (Sant Kabir Nafa Dist). Ealier Chakrabarti also found evidences of nail manufacture in India[25]. In Tamilnadu, iron nails were found at Sanur and Tirukkambuliyur [26] in megalithic level[27]. In Andhra, carpentry tools like chisels, iron axes, adzes, flat celts, wedges and iron nails were found at the excavations of Nagarjunakonda, Agripalli, Satanikotta etc[28]. At sites like Yelleswaram[29], Brahmagiri and Maski, sickles, arrowheads, and nail fragments were found. As the maritime activities have been well-established from the Satavana period and were peak diring the Cholas period, the shipbuilding and allied industies must have been changed with the progress of industry.

The manufacturing centres and ports had been within the traditional boundaries: Movement of ships from Cape Comorin, Kayalpatnam, Tutocorin, Nagapatnam, Karaikal, Tranqubar, Porto Novo, Fort Saint David, Tegenapatnam, Puducherry, Sadrasapatnam, Kovilam, Madras, Pulicat, Petapuli, Narsapur, Masulipatnam, Palikollu, Cocanada, Visakapatnam, Bhimlipatam, Balasore and other coastal ports were clearly recorded in their documents and they had been also the coastal navigational path of Indians since c.1000 BCE. Satavanas, Pallavas and Cholas were ruling this area. During their reigns, the workers were engaged with Temple-building activities, which were centres of all skills. Similarly, the places connected with mining of ores and metal working, were also well connected by the traditional road-routes. The places in and around Kolar, where the Cholas domination could be noted was connected with Andhra cities and ports. For example, Malur had been a town NW of Kolar, on the Bangalore Branch Railway-Road. It was known as "Malligapuram", Mallika-pura and now Malur. By road, it is connected with Hosake on the north-west, with Kolar on the NE, and with Hosur in the Salem District. It is also connected with Narsapur and Masti also has to be noted. Thus, the movement of goods and men in these cities could be understood easily. During the medieval period, with the advent of the Moghuls and the Europeans trading enterprises, such skills were exploited for more production of goods and services. Thus, the skilled, semi-skilled labours were also exported in their colonial exploitation. Generally the northern factories (in Andhra) were subject to a number of inconveniences and incumbrances, the result of internal disturbances and decline of local authority[30].

The Narsapur shipbuilding has two historical narratives: That traditional shipbuilding activities were there on the Coromandel Coast has already been pointed out. However, the European Companies had different problem of cargo-space for their exports and imports. As the increased volume of return cargo created shortage of shipping space, they required more ships for their cargo. As the Dutch commercial enterprise revolved around Batavia, it could not spare enough ships for the Coromandel Pegu trade and for carrying food-crops from Bengal and Orissa to Ceylon. Though Coromandel authorities at first tried to solve this difficulty by hiring small Indian boats, to cut down the expenses, they decided to build ship, loaded with locally procured and manufactured goods. Thus, in 1652, Batavia authorised them to undertake the building of small ships of 50 to 70 'lasts' and some skilled master craftsmen were sent to the coast for the purpose, thus, construction of ships and boats was started accordingly on a regular basis at Bimlipatam, Naraspur, Masulipatam and Pulicat[31]. "*The galliots and sloops built in these places were found useful not only for navigation along the Indian coast, but also for commercial purposes in Amboina, Banda, Ternate and Malacca. Their average tonnage was not more than 70 'lasts', but at least one ship of about 200 'lasts' was built in Bimlipatam. The expenses of ship-building in Coromandel were considered rather high by the Amsterdam authorities, and when the Coromandel factors went beyond their instructions to produce a fluyt at a cost of 36,463 florins, Batavia objected strongly. Even the construction of ships which could be built as cheaply as in Holland was forbidden. Shortage of shipping space continued to worry the Company, but the manufacture of ships in Coromandel was definitely stopped by 1661 as the expenses were considered exorbitant, only a small establishment being started at Vizagapatam for repairing ships*"[32]. This is completely contradicting with the claimed narratives of so many other researchers and scholars, who have recorded that the shipbuilding cost was cheap at Narsapur and other port-cities of the Coromandel Coast. As the discussion is about Iron and steel products in question, the intriguing point has to be analyzed critically. the Here, the cost worked out was not that of the ship-built, but that of the entire shipment of goods and services involved in exports and imports. As the private trading was there among the Company masters, sailors and soldiers, evidently, these cost factors were suppressed.

The export of Iron and Steel products to Europe: The demand for Iron was so great during the 17th-18th centuries and the European Companies imported ferrous ore, products etc., from the South Asian countries, particularly from India. Thus, the Dutch exported "Coromandel iron", during the 1600s, as the European wars produced demand for Pig iron, iron bands, iron bars and cannon balls were required in large quantities, not only for the factories in the East Indies and Ceylon, but also for the Company's trade with Arakan and Tonkin. Coromandel iron bars were also exported from Batavia to Manila. The manufacture of these articles was therefore organised on a large scale in several factories under the supervision of Dutch experts, and by 1667 the exports reached a peak. In 1667,

1. 105,000 Ibs [47.6 MTs] of iron nails,
2. 188,000 Ibs [85 MTs] of cannon balls,
3. 189,000 Ibs [86 MTs] of iron bars and
4. 10,000 Ibs [45 MTs] of iron bands were exported from Coromandel.

The different varieties yielded 80 % to 100 % gross profits in the East Indies[33]. As discussed above, in 1672, a Swedish expert sent from Batavia taught the Indian blacksmiths a quicker method of manufacturing nails and cannon balls which would quadruple the rate of production. But the local authorities disallowed the introduction of this new method as it might eventually deprive many blacksmiths of their livelihood, thus noted Raychudhury, but, the reality could be to suppress the facts of profits and inhuman slave trading that expolited abd killed Indians.

Discussion and Conclusion: The study of the establishment of Dutch factories in and around Narsapur had been significant, because of the technical expertise, raw materials and other facilities available. After the fall of Vijayanagar empire, the Golkonda sultans controlled the trade and they exercised influence on the European companies. Thus, both forces controlled the indigenous people and their social, commercial and economic conditions. The native technical experts and workers were at the mercy of them and thus, they were exploited maximum. As the Indian researchers have to depend upon the European and Moghul documents, the native version is not taken into account in such historical and historiographical narratives in the context. The early medieval and medieval Tamil literature and Chola inscriptions give the position and condition of metal workers of different categories. The Chola-Vengi relations, conquest of Kalinga and other activities prove the presence of the Cholas and their feudatories in these areas[34]. Draksharamam inscriptions have been very specific[35]. As the imperial Cholas were having coastal navigation contacts with the "Bay of Bengal" port-cities and maritime contacts with SEA countries, it is evident that after their sudden disappearance in 13th century, fall of Vijayanar in 16th century and the domination of the Moghuls and European forces, thereafter, the same places were occupied by them to continue the manufacture of goods, of course, according to the specifications of the Middle-east and European consumers.

1. The location of Narsapur and surrounding cities and port-cities by the Dutch has not been incidental, but, it is historically popular with the same activities.
2. The Cholas metallurgical skills were exhibited in their temple building, shipbuilding land surveying and other activities.
3. The native manufacturing techniques were utilized by the Mohammedan and European rulers and traders.
4. The change of rule, religion and other factors might affect societal factors and not economic and commercial exploitation, where, all play together.
5. In such processes, the change, modification and methedology of manufacturing processes might have been changed, but not the inputs, rawmaterials and the local Indian expertise.

6. The manufacture in India was cheap and export to European destinations with the locally built ships reduced cost considerably with the increase of profits.
7. Of course, because of industrialization, modernization could have been taken place, yet, Indian consumers have indigenized them, as exhibited in their domestic electrical and industrial appliances.
8. In the context, the Dutch East India Company (VOC), lost its battle, because of its inherent factors.
9. The conflicts of dominant European countries in religious, social, political and economic factors reflected on their EICs.
10. The rivalry among the European Companies and the ultimate domination of the British decimated other EICs.

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8. Sir Richard Carnac Temple (Ed.), *The Diaries of Streyansham Master 1675-1680*, Government of India, 1911, Vol.II, p.160.
9. There seems to have been some confusion among the English at this date between Narsapur and Navarazpuram. 'Narsapore' is used indiscriminately for both places. For instance, in Factory Records, Masulipatam, vol. ii. , Mr. Fleetwood's great house, mentioned below, is said to be in ' Narsapore.' The foot note.5 has been reproduced verbatim as appearing on p.no.160. Some records used "Narsapurpeta / Narsapur Peta", thus, Sanjay Subramanyam used it.
10. Gingerlee or Gingalee was the seventeenth-century term for the coast between the estuary of the Godavari and the Jagannath Pagoda. See Bowrey, Countries Round the Bay of Bengal, p. 120, n. i.

    The coast to the north of the Godavari was known as the Gingelly coast, a name at times used as synonymous with the 'Orissa coast.

    Tapan Raychaudhury, *Jan Company in Coromandel*, S-G Ravenhage – Martinus Nijhoff, 1962, p.1

Footnotes

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[10] Gingerlee or Gingalee was the seventeenth-century term for the coast between the estuary of the Godavari and the Jagannath Pagoda. See Bowrey, Countries Round the Bay of Bengal, p. 120, n. i.The coast to the north of the Godavari was known as the Gingelly coast, a name at times used as synonymous with the 'Orissa coast. Tapan Raychaudhury, *Jan Company in Coromandel*, S-G Ravenhage – Martinus Nijhoff, 1962, p.1

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[13] The "black" in "blacksmith" refers to the black fire scale, a layer of oxides that forms on the surface of the metal during heating. The origin of "smith" is debated, it may come from the old English word "smythe" meaning "to strike" or it may have originated from the Proto-German "smithaz" meaning "skilled worker". However, in colonial and racist connotation, black was characteristically refers to Indian black and Indian also, as could be noted from their records.

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